

Factsheet final findings Applied Research Fund Call 2



Designing appropriate agronomic and processing practices for pineapple supply chains in Benin

Summary

The DAPIS project aims at improving the quality of fresh pineapple and pasteurised pineapple juice in Benin for the local, regional and international market. The research questions were: (1) What are the fresh pineapple quality attributes and criteria for pineapple producers, wholesalers, retailers and processors? (2) What are the pineapple agronomic practices that meet local, regional and international markets? (3) What are the pineapple juice processing technologies that meet the local and regional market demand? (4) What are the appropriate (low cost) pineapple agronomic practices that meet local, regional and international markets? The study applied qualitative research methods such as in-depth interviews and focus group discussions, to assess the main pineapple quality attributes and criteria for the main actors involved in the Beninese pineapple supply chains. Field experiments including agronomic experiments and processing experiments were co-implemented and evaluated with stakeholders to assess the best agronomic and processing practices. A quantitative research method was also applied for cost and benefit analysis, which helped advise stakeholders on economically acceptable agronomic practices meeting the expectations of customers.

Research findings

In Benin, the quality of pineapple does not often meet the expectation of traders and processors, who complain about the short shelf life (~3 days) of the fruit. Moreover, the yield is low and around 47.5 tons/ha. Through joint experimentation with stakeholders, agronomic practices were developed to produce pineapples with a shelf life of ten days on average with a yield ranging from 75.6 to 84.6 tons/ha using a planting density of 66 600 or 74 000 plants/ha and proper fertiliser management based on ratio $K_2O:N=1$. Pineapple fruits produced at a density of 54400 plants/ha (65.8 tons/ha) with ratio $K_2O:N=1$ gave the sweetest fresh fruit and pasteurised juice, and was preferred by most consumers. Among the technologies applied by pineapple processors, the juice produced without addition of lemon with two thermal treatments was the most appreciated based on the sweetness/acidity taste balance and aroma. Pineapple juice can be pasteurised at low temperature (75°C) for a limited storage period of 4 months. When the juice is pasteurised in the range of 80-85°C, it can be stored for 10 months with high nutritional quality. Moreover, producers can obtain a profit ranging from 1,084,370 FCFA/ha to 1,411,630 FCFA/ha for a pineapple production cycle of 17 months.

Outcomes achieved

Approaches used to develop technologies in the project led to some unexpected behavioural changes. For instance, farmers involved in different agronomic practices-related experiments at Zè (one of the experiment sites) were not organised in a farmers' organisation. Through this project, they brought themselves together and established a new farmer association named NONVIGNON-MIHINMIDE. They set as objective that they want to produce high quality pineapple based on what they learnt from the experiment i.e. to become specialised farmers. The second behavioural change was also observed among NONVIGNON-MIHINMIDE's farmers who rented one hectare of land and started producing pineapple based on practices they observed at the farm, without waiting for our final choice of best agronomic practice. Furthermore, most of the farmers started adopting some recommended agronomic practices, like sorting the planting materials before planting as was done in the joint experiments. Some behavioural changes were also noticed among some processors, who started adopting processing practices in relation to the customers preference or short- or long-term niche market.

Project messages to	<p>A) Actors from private sector:</p> <ul style="list-style-type: none"> The private sector should invest in the production of fresh pineapple, taking into account the agronomic practices developed by DAPIS, to fulfil the tonnage requested by the Beninese government through its Government action program. Entrepreneurs should start to produce fresh pineapple for a given market using the technical sheets developed in the framework of this project. <p>B) Civil society and practitioners organizations:</p> <ul style="list-style-type: none"> Action should be taken to improve processors skills in Good Manufacturing Practices and quality control, for example, measuring pasteurisation temperatures of the juice during the heating treatment. Train a group of specialized traders to collect the pineapples that are suitable for juice making from wholesalers and possibly the left-overs from merchants. <p>C) Policy makers:</p> <ul style="list-style-type: none"> The Extension Department of the Ministry of Agriculture should work on the dissemination of the new agronomic practices based on DAPIS outputs in order to improve pineapple producers' livelihood. Policy makers should change the pricing system of the pineapples, which should be based on weight (kg) and not on number of trucks called "bachées", as it is now. The Beninese Agency for Sanitary Security of Foods (BASSF) should work on systematic quality control of juice on the market to encourage the best manufacturing practices among processors.
Knowledge products	<ul style="list-style-type: none"> News item Matin Libre: Clôture des activités du projet Dapis : Pour une compétitivité de la filière ananas au Bénin (June 2019) News item Zoom Agro: Clôture du projet Dapis Les acteurs font le point (June 2019) Success story: A spark of hope for pineapple farmers in Benin (March 2018) YouTube video: Validation des résultats de recherche du projet DAPIS par les acteur de la filière ananas au Benin (February 2018) Success story: Farmer's voice matters in agronomic practices development (October 2017) YouTube video: Visite des sites d'expérimentation du Project DAPIS (September 2017) PowerPoint presentation: Designing appropriate agronomic and processing practices for pineapple supply chain in Benin – From output to outcome (October 2016)
Knowledge networks	<p>Members of DAPIS are part of a platform called 'Marché agricole', where knowledge and practices are shared among stakeholders of the platform. The coordinator of the DAPIS project is an active member of the ANATLAB (Association of pineapple processors in Benin) and the director of "Table filière Ananas", partner of the ARF research consortium, is currently the president of FENACOPAB (National Federation of pineapple villager cooperative of Benin) with thousands of pineapple producers as members. The FENACOPAB is currently involved in the implementation of a project led by ENABEL (Belgian Agency of Development) which has the mandate to improve the competitiveness of pineapple in Benin. FENACOPAB is currently raising the voice of DAPIS within ENABEL, so that many producers and processors are aware of the technologies that have been developed.</p>
Knowledge co-creation	<p>The problem tackled in this project was defined with the stakeholders when submitting the proposal to ARF and finetuned later after the proposal had been approved. When submitting the project, each stakeholder was invited to express the problem encountered in pineapple sector. Representative of producers, Table Filière Ananas, and processors, ANATLAB, helped a lot in targeting real problems. After the proposal approval, workshops were conducted with each stakeholder and once again, they expressed their problem. This is where most of them argued that the shelf life of the pineapple fruit was short. Thereafter a focus group discussion with pineapple producers was conducted to explore how they grow pineapples and what options of improvement are. The producers helped design the experiment by defining the factors and variables to measure the fruit quality. After setting the experiments, all stakeholders were invited to appreciate the quality of the fruit and define the highest quality pineapple for fresh consumption or processing. From the processing side, juice producers evaluated the pasteurised pineapple juice quality encountered on the markets. From that point, experiments were designed taking into account these preferences. Pasteurised pineapple juice produced with different technologies were stored for one year; stakeholders participated actively to the sensory evaluation of the juice of different storage periods and give their appreciation.</p>
Consortium Partners	<ul style="list-style-type: none"> Group Magnificat (GM) "Allotcheou" Fruit beverage company Table Filière Ananas (TFA), Pineapple Stakeholders Platform University of Abomey-Calavi, Faculty of Agronomic Sciences Plant Sciences, Centre for Crop Systems Analysis – Wageningen University and Research
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